REMARKS

In view of both the amendments presented above and the following discussion, the Applicants submit that none of the claims now pending in the application is obvious under the provisions of 35 USC § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, the Examiner should telephone Mr. Peter L. Michaelson, Esq. at (732) 542-7800 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Specification amendments

Various amendments have been made to the specification to correct minor inadvertent grammatical, punctuation and formal errors that still remained in the specification.

Status of claims

To simplify the Examiner's understanding of the claims and expedite their prosecution, the Applicants, rather than re-writing their claims to include numerous changes, have simply canceled their prior claims 14-27 and substituted new claims 28-47 there for.

New independent claim 28 defines the present invention with increased precision than did prior independent claim 14. In that regard, this new claim essentially incorporates, along with

other recitations, the substantive limitations of prior claims 14, 16 and 17. No new claim corresponds to any of prior claims 16, 17, 23 and 24.

The following table shows the correspondence between the immediately prior claims and certain ones of those now pending.

Present Claim	Prior Claim(s)	Present Claim	Prior Claim(s)	Present Claim	Prior Claim(s)
28	14+16+17	31	19	--	24
29	15	32	20	35	25
---	16	33	21	36	26
---	17	34	22	37	27
30	18	--	23		

New independent apparatus claim 38 is similar to, though directed to a different embodiment than that recited in, independent claim 28. New claims 39-47, all of which depend from claim 38, are very similar to new dependent claims 29-37.

Rejections under 35 USC § 103

A. Prior claims 14, 15 and 18

The Examiner has rejected prior claims 14, 15 and 18 under the provisions of 35 USC § 103 as being obvious over the teachings of the '514 Spaur et al patent (United States patent 6,122,514 issued to C. W. Spaur et al on September 19, 2000) taken in view of those in the '767 Ishida et al patent (United States patent 6,493,767 issued to T. Ishida et al on December 10, 2002). Inasmuch as all these claims have now been canceled, this

rejection is moot. However, given that these claims have been replaced by corresponding new claims 28, 29 and 30, then, to expedite prosecution, this rejection will be discussed in the context of these new claims and principally with respect to new independent claim 28. In that context this rejection is respectfully traversed.

The Examiner takes the position that the '514 Spaur et al patent discloses, with one exception, all the features of prior claim 14 though in the context of measuring inter-packet receive time, i.e., the time period between the reception of two successive packets in a common session. That exception is a billing system, which the Examiner concedes is absent from that patent. The Examiner further notes, with specific reference to col. 4, lines 37-49, that this patent teaches that a link controller/monitor can utilize dynamic cost-related data, which can include cost estimates based on factors such as the volume of an information transfer. The Examiner states that the '767 Ishida et al patent discloses in FIG. 5, and as discussed in col. 13, line 64 through col. 14, line 3, a traffic volume measuring function 25 which measures accumulated packets per hour. Given these teachings, the Examiner concludes that it would have been obvious to one skilled in the art to modify the teachings of the '514 Spaur et al patent to include a billing system that bases its charge, as taught by the '767 Ishida et al patent, on volume of information transferred, where that volume is measured by inter-packet receive time, thus yielding the invention as then recited in claim 14. With such a resulting arrangement, a user would be charged more if a larger number of packets are sent in a shorter time thus reflecting use of a faster connection.

Given that the '514 Spaur et al patent lies at the core of this rejection (as well as forming the basis for all the others, as will be discussed below), the Applicants will first address the salient teachings of this patent, and will then address the specific teachings in col. 4, lines 37-49. Next, the Applicants will quickly discuss the salient teachings of the '767 Ishida et al patent. Finally, the Applicants will address their present invention, as now recited in claim 28, and discuss why it differs from and is not obvious in view of the combined teachings of these two applied patents.

As the Applicants have previously discussed in their prior amendment mailed March 26, 2007, the '514 Spaur et al patent is directed to a methodology for selecting a particular packet connection (channel) from amongst several such connections based on assessing channel parameters of all such connections against application-based (desired) requirements for a needed channel. See, e.g., col. 2, line 3 et seq and col. 4, line 50 et seq thereof. To do so and as described in, e.g., col. 2, line 57 et seq, a link selector (14 shown in FIG. 1) accesses a link database (54 also shown in FIG. 1) that stores network channel parameters. These parameters essentially characterize or define current capabilities of each channel.. In light of the requirements of a given application, these parameters for each channel are assessed by comparing each such parameter against its corresponding application requirement. Should any such comparison reveal that a channel cannot satisfy an application requirement, then that particular channel is no longer considered. Illustrative channel parameters are listed in col. 7, line 41 through col. 8, line 3. Illustrative application requirements are listed in col. 8, line 17 through col. 8,

line 61. Both these parameters and requirements include "packet jitter", namely variations in inter-packet arrival times.

For those channels which remain and hence are deemed acceptable, a suitability analysis is then conducted to determine which particular channel would be best suited for the application and hence is to be selected for current use. As described in col. 3, line 23 et seq and col. 8, line 62 et seq, this analysis involves calculating a weighted vector of the channel parameters where each such requirement is weighted by a factor (stored within database 38 shown in FIG. 1) associated with the corresponding application requirement. As indicated by illustrative equations in col. 11, lines 41-43 and lines 51-53, a suitability value is simply determined as a sum of the weighted channel parameter values. The channel then having the highest suitability value may then be selected for use.

In addition to selecting the link based on a suitability analysis, issues related to timing of information transfer, including when one or more channels will become available, are also considered. In that regard, a link scheduler (scheduler 70 shown in FIG. 1 and discussed in col. 12, line 22 et seq) determines, particularly with respect to channels used by a mobile terminal, those channels that may subsequently become available owing to movement of that terminal or are going off-line, and hence whether information involving that terminal should be transferred immediately over an available channel or buffered until another, more acceptable channel later becomes available. See, col. 13, lines 47-51.

As noted in col. 4, lines 37-49 and to which the Examiner makes specific reference, the link selector also

receives real-time channel performance data from a controller/monitor. This data specifies how well information is currently being transferred over any channel in terms of parameters such as measured signal strength, measured packet loss, measured packet latency and measured packet jitter. Through use of this data, the channel selector may deem that a different channel should now be selected. This data may also include cost-related data, as the Examiner specifically recognizes and as expressly stated in col. 4, lines 44-49, as follows:

> "In addition to the data obtained by monitoring, dynamic cost-related data can also be obtained *by requesting such information from network channel or carrier providers*. These carrier providers can supply *cost estimates based on factors such as the extent or volume of the information transfer.*" [emphasis added]

As this quoted passage clearly contemplates, the cost data is not calculated by the apparatus taught by the '514 Spaur et al patent but rather it is an estimated value that is merely requested, by the link selector, from a network provider. In that regard, the link selector apparently specifies how much data it then desires to transfer or has transferred over a channel, e.g., a volumetric measure such as a number of Kbytes or Mbytes, or perhaps at what rate, e.g., Kbytes/second or Mbytes/second, to the provider and, that provider, in turn, returns an associated cost estimate for the expected transfer. The selector then takes this estimate into account in deciding on an appropriate channel to then use.

What this passage does not state at all -- and the patent fails to describe anywhere -- is just how this cost estimate is determined. Of course, this is not surprising as the estimate is not generated by the channel selection apparatus

taught by this patent but is merely externally provided to the apparatus by the network operator itself.

In light of that omission, one can only surmise that the network provider uses a conventional approach, such as, e.g., using the desired numeric volume or rate dynamically provided by the link selector, for an ensuing transmission, to access a pre-defined tariff (rate table) of some sort and, using salient data from the table, extrapolate a cost estimate for carriage of that transmission and finally supply that estimate back to the link selector.

Contrary to the Examiner's view, while the '514 Spaur et al patent teaches the concept of measuring inter-packet receive time, it does so not for the purpose of formulating a charge for network carriage -- as it receives an estimate therefor externally from a network provider, but rather to determine actual "packet jitter". Packet jitter is simply a measure of the differences in the arrival times of successive packets at their destination. Jitter has several causes, including, in a mobile network, movement of a mobile terminal from place to place as well as obstacles then occurring in a signal path that may cause signal reflections and thus adversely affect both transit time over a channel and hence more generally channel performance. See, e.g., col. 1, line 44-45; col. 7, lines 51-52 and col. 8, lines 33-34 and col. 10, lines 5-8 (all of these passages having been specifically referenced by the Examiner). As noted above, packet jitter, both desired and measured, is one of several operational parameters that characterize dynamic channel performance and is used by the channel selector in selecting a particular channel to use at any given time.

Packet jitter has nothing whatsoever to do with determining a charge for carrying packet traffic over a channel. Jitter, being reflective of differences between successive packets, is a rather granular (fine) measure. A network connection charge, conventionally based on an expected or actually-occurring volume of packet traffic occurring over a given time (whether in terms of a cumulative packet count or a packet flow rate over the duration of an entire connection), is, by comparison, a coarse quantity -- as the '514 Spaur et al patent clearly contemplates. Jitter has no influence or bearing on a network connection charge, and vice versa.

Contrary to the Examiner's view, there are simply no teachings or even a suggestion in the '514 Spaur et al patent as to why any one of skill in the art would want to use the inter-arrival time to calculate a network transport charge, let alone how to do so. The former is described for use in determining packet jitter; the latter is not described at all.

As the Examiner correctly recognizes, the '767 Ishida et al patent teaches, in the context of a network address supply system, the concept of measuring traffic volume in terms of ascertaining an accumulated packet count per hour. Obviously, given such a wide time span, this results in a rather gross measurement. The reason behind such a measurement is simply to compare actual traffic volume that occurs between line concentrators 10a, 10b and terminals 100a-100e with a fiducial value stored in a fiducial traffic volume memory table 26. If the actual traffic, as measured by traffic volume measuring function 25, is less than the fiducial value, then function 25 issues a command to invoke address requesting function 22 to

transmit a "DISCOVER" packet. See, not only col. 13, line 64 through col. 14, line 3 as referenced by the Examiner, but also the immediately following paragraph in col. 14, lines 4-19 (which the Examiner does not reference). This has absolutely nothing whatsoever to do with billing for packet transport -- a concept that is glaringly absent from the '767 Ishida et al patent.

Now, if one were to hypothetically incorporate, as the Examiner surmises, the traffic volume measuring function taught by the '767 Ishida et al patent into the teachings of the '514 Spaur et al patent, the only plausible result would be that the request from the link selector, to the network provider for an estimate of transport cost, would instead be supplied to the traffic volume measuring function. Though, the '767 Ishida et al patent fails to disclose how that function would determine a cost estimate, it is quite plausible for it to do so, in accordance with the Applicants' view regarding the '514 Spaur et al patent, i.e., in the same manner as the network provider would when so requested. Specifically, the measuring function could incorporate some type of tariff, through, e.g., a fixed rate table, or a predefined function, and given the anticipated or actual volumetric traffic or flow rate as input, calculate a corresponding network charge through the tariff or function and supply that result back to the link selector.

Inasmuch as there is no motivation, suggestion or teaching to modify the methodology through which a network provider calculates a packet data connection charge when that methodology is to be incorporated into the traffic volume measuring function as the hypothetical combination would require, then certain deficiencies inherent in the former would exist in the latter and hence in the hypothetical system as well.

It is just those deficiencies which the present Applicants recognize and advantageously solve. Accordingly, as the Examiner will soon agree, the hypothetical system, which results from his purported combination of the teachings of the two applied patents, stops well short of the present invention, as now claimed.

The present invention is directed to an approach for determining a proper charge for transporting bursty network traffic through a packet, specifically ATM, connection, and particular such a charge that acts as a financial incentive for a user to smooth out traffic flow throughout the duration of the entire connection. The Applicants state, on page 3, paragraph 9 of their specification (this and all following references to the specification being to the substitute specification filed with the Applicants' prior amendment mailed January 27, 2005) that conventional approaches for charging for packet network connections, particularly in an ATM (asynchronous transfer mode) environment, simply rely on calculating the charge based on a total duration of the connection and a cumulative (total) number of cells carried during the entire connection, i.e., start-to-finish. Under such an approach -- which is clearly contemplated by the teachings of '514 Spaur et al patent, no difference occurs in the charge whether the packets are sent at a constant rate or occur in a bursty mode, i.e., exhibiting marked peaks in packet flow at some times during the connection relative to others. However, from the perspective of the network provider, network resources would be more efficiently utilized if a relatively smooth packet flow would occur throughout the entire connection rather than being concentrated in bursts. There are simply no teachings in either the '514 Spaur et al or the '767

Ishida et al patents as to how to avoid that inefficiency -- as both patents are totally oblivious to this problem.

To formulate such a charge, the Applicants, in accordance with the present invention, teach the concept of essentially breaking the entire duration of a packet connection into multiple successive time periods and basing the charge on the packet flow rate occurring during each and every one of these periods, rather than, as was conventionally done, just on cumulative packet count occurring start-to-finish throughout the entire connection. Since the packet flow rate can be simply calculated as number of packets per unit time, either one of two approaches can be taken: (a) fix the number of packets (N) to a predefined value and measure a duration (t) of each time period during which that number of packets flows through the connection, or (b) fix the duration of the time periods and measure the actual number of packets that flows through each such successive time period. Through either approach, the packet flow can be determined for each period from a simple ratiometric calculation, $r = N/t$. To disincentivize a user from requiring the network to transport a bursty packet flow, the time periods that exhibit a sufficiently higher packet flow rate than the others will effectively carry a higher incremental charge than the others. The overall charge is then determined, through a billing system, in response to the flow rate that occurred during each and every time period throughout the connection. Further, for enhanced accuracy, the billing system can also take into account, in formulating the connection charge, the capacity or priority requested by a user and ultimately assigned by the network operator (telecommunications system) to that user for the connection -- these characteristics being specified by corresponding parameters in system packets carried over that

connection. As a result of the present invention, the incremental connection charge will track the packet flow rate on a period-by-period basis substantially throughout the connection -- which simply does not occur in the conventional approach taught in the art.

New independent claim 28 contains suitable limitations that clearly and explicitly recite these and other distinguishing features of the present invention. This claim recites as follows, with those recitations shown in a bolded typeface:

> "A system for use in conjunction with a packet based telecommunication network for determining a charge for a packet connection therethrough, the charge being responsive to dynamic changes in packet loading occurring during the connection, the network carrying system packets (RM, RESV) which comprise first and second indications (r1, r2) of capacity or priority as respectively requested by a user for a connection and, in response thereto, assigned to that connection for the user by the telecommunication system, the system comprising:
>
> **a measuring device for measuring a duration (t) of each of a plurality of successively occurring time periods during which a predefined number (N) of packets in a packet stream that belong to a common packet connection are received or transmitted through the connection so as to define corresponding ones of a plurality of measured time periods, wherein the predefined number is less than a total number of packets transported during the connection and the time periods extend substantially throughout an entire duration of the connection;**
>
> **a billing system, responsive to the measuring device, for formulating a charge for use of the connection;**
>
> **a first detection device, responsive to the system packets in the packet stream and associated with the connection, for reading out the first indication (r1) from the system packets and**

transferring the first indication (r1) to the billing system; and

a second detection device, responsive to the system packets in the packet stream and associated with the connection, for reading out the second indication (r2) from the system packets and transferring the second indication (r2) to the billing system; and

wherein the charge for the connection, as determined by the billing system, reflects the measured duration (t) of each one of the measured time periods, such that a corresponding incremental charge for each one of the periods responsively tracks changes in the packet flow (N/t) then occurring on a period-by-period basis substantially throughout the entire duration of the connection, the charge also reflecting the first and second indications (r1, r2)." [emphasis added]

With the above in mind, the two applied patents patent simply do not teach, show or suggest, whether explicitly or let alone implicitly, the expressly claimed features of, among others:
a) measuring the duration of each time period, substantially throughout the duration of the entire connection, during which a pre-determined number of packets flow in a packet stream over that connection, wherein an incremental charge associated with each of the time periods tracks changes in packet flow on a period-by-period basis substantially throughout the entire duration of the connection; and
b) formulating, through a billing system, a network charge for the connection based on: (i) the measured duration of each of the periods, and (ii) the capacity or priority as requested by a user for the connection and as assigned by a telecommunications system to the connection.

Thus, the Applicants submit that claim 28 is not rendered obvious under the provisions of 35 USC § 103 by the

teachings in the '514 Spaur et al and the '767 Ishida et al patents regardless of whether those teachings are taken singly or in any combination, including that suggested by the Examiner.

Each of new dependent claims 29 and 30, directly or indirectly, depends from claim 28 and recites further distinguishing features of the present invention over those recited in the latter claim. Consequently, the Applicants submit that each of these dependent claims is also not rendered obvious under the provisions of 35 USC § 103 over the teachings in these two applied references for the same reasons set forth above with respect to claim 28.

Hence, this rejection should now be withdrawn.

New independent apparatus claim 38 which is directed to the second inventive approach (rather than the first as is claim 28), namely using a fixed measurement period and counting the number of packets that flow during each such period, is otherwise quite similar to independent claim 28. Hence, the Applicants submit that claim 38 is also not rendered obvious for essentially the same reasons set forth above with respect to claim 28.

Each of new dependent claims 39-47 depends, either directly or indirectly, from claim 38 and recites further distinguishing features of the invention recited in the latter claim. Hence, likewise, each of these dependent claims is not rendered obvious under the provisions of 35 USC § 103 over the teachings in the two applied references for essentially the same reasons set forth above regarding claim 28.

B. Remaining prior claims

The Examiner has posed three rejections under the provisions of 35 USC § 103, each being directed to a different group of the Applicants' prior dependent claims and based on the combined teachings of a different corresponding group of applied references. Inasmuch as all these prior claims have now been canceled, this rejection is moot. However, to expedite prosecution, this rejection will principally be discussed in the context of new independent claim 28 (from which each of the new dependent claims, which corresponds to one of these prior canceled dependent claims, depends; these new dependent claims being 31-37). In that context, all these rejections are respectfully traversed.

Specifically, the Examiner has rejected:

a) dependent claims 16, 17, 19 and 20 as being obvious over the teachings in the '514 Spaur et al and '767 Ishida et al patents taken in view of those in the '046 Saari et al patent (United States patent 6,338,046 issued to J. I. Saari et al on January 8, 2002);

b) dependent claims 21, 22 and 25 as being obvious over the teachings in the '514 Spaur et al and '767 Ishida et al patents taken in view of those in the '740 Ito et al patent (United States patent 5,923,740 issued to K. Ito et al on July 13, 1999); and

c) dependent claims 23, 24, 26 and 27 as being obvious over the teachings in the '514 Spaur et al and '767 Ishida et al patents taken in view of those in the '046 Saari et al and '740 Ito et al patents.

The Examiner cites to the '046 Saari et al patent for its teachings, in a technique for charging for an ATM connection in a packet network, of system packets in an ATM packet stream that contain indications of capacity or priority requested by the user or assigned by the telecommunications system. The Examiner also points to billing system 40 (as shown Fig. 3 and discussed in col. 5, lines 16-27 and col. 6, lines 26-28). In particular, the Examiner notes that ATM node 24 in the network receives billing cell 31 (a cell in an ATM packet stream) that contains connection information 38, this information including various ATM service and traffic parameters including requested and assigned priority and capacity. The Examiner also cites to this patent for its teachings of a billing system that aggregates billing information from each network node, that carried packet traffic, for a common ATM connection to yield a total charge for that connection.

The Examiner correctly summarizes certain teachings from the '046 Saari et al patent. Yet, as with the '514 Spaur et al and the '767 Ishida et al patent, these additional teachings simply fail to disclose or even just suggest the present inventive combination, as recited in claim 28, based principally on the features of:

a) measuring the duration of each time period, substantially throughout the duration of the entire connection, during which a pre-determined number of packets flow in a packet stream over that connection, wherein an incremental charge associated with each of the time periods tracks changes in packet flow on a period-by-period basis substantially throughout the entire duration of the connection; and

b) formulating, through a billing system, a network charge for the connection based on: (i) the measured duration of each of the

periods, and (ii) the capacity or priority as requested by a user for the connection and as assigned by a telecommunications system to the connection.

The Examiner cites to the '740 Ito et al patent for its teachings of an ATM billing system and specifically one which bases a charge on a number of counted ATM cells. While the Examiner's recognition here is indeed correct, the time over which the cells are counted is the duration of the entire connection. In that regard, col. 2, line 61-67 states, in pertinent part:

> "*On call termination*, the billing data collector 5 edits the billing data *according to a cell count value* in the ATM cell counter ... . *The edited billing data is sent to the charging center.*" [emphasis added]

This patent is devoid of any teachings or suggestions that packets, here being ATM cells, should be counted, as the Applicants now teach, during a time period which is shorter than the duration of the connection, let alone during each successive one of a series of such periods where an incremental charge for each period will track changes, on a period-by-period basis, in packet flow rate during that connection.

The teachings presented by these two additional patents simply add nothing to close a gap that exists between the combined teachings of both the '514 Spaur et al and '767 Ishida et al patents and the present invention, specifically the combination of its principal features, as recited in claim 28. Consequently, any combination of the teachings in the '046 Saari et al and/or '740 Ito et al patents with those in '514 Spaur et al and '767 Ishida et al patents would result in a hypothetical

combination that would still fall -- to the same extent as would result from the combined teachings of just the latter two patents -- far short of the present invention as recited in claim 28.

Hence, the Applicants submit that claim 28 is not rendered obvious under the provisions of 35 USC § 103 by the teachings in these four applied patents, regardless of whether those teachings are taken singly or in any combination, including those suggested by the Examiner.

Each of new dependent claims 31-37, directly or indirectly, depends from claim 28 and recites further distinguishing features of the present invention over those recited in the latter claim. As such, each of these dependent claims is also not rendered obvious under the provisions of 35 USC § 103 over the teachings in these four applied patents for the same reasons set forth above with respect to claim 28.

Thus, each of these rejections should also now be withdrawn.

Conclusion

Consequently, the Applicants believe that all their claims, as they now stand, are presently in condition for

allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

May 19, 2008

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